

IN THE SPECIFICATION

Please replace the paragraph beginning at page 1, line 5 (including title), with:

The invention comprises a method and a device to visualize in-line and quantify the polymer melting in plasticating screw machines during processes that may include phase changes of the polymeric material under study, such as extrusion, blow molding and injection molding. The invention is based on the need to visualize and quantify the polymer melting in plasticating screw machines in real time, safely and non-invasive to the process to be able to maintain its thermal regime. The problem is solved by capturing images in-line and experimental data from the inside of the plasticating screw machine through a device with a small optical window, which allows the use of an observation probe with operating temperature limits and with an illumination system. The device allows to visualize the differences in optical properties between the polymer's solid state and its melt state enabling to describe its complete melting mechanism in a plasticating screw machine. The device allows to visualize all of the states or phases of the polymer melting process, such as the solid material, the formation of the first melt film, the delay in the formation of the melt pool, the molten material and anomalies in the melting, in case these latter exist, since several polymers do not present them. The device is comprised of an external metallic cylinder to be set in radial position regarding the barrel of the plasticating machine, a bushing with an optical window clear to the visible light spectrum, resistant to the pressure and to the temperature, positioned in such a manner that its external face is tangent to the internal surface of the plasticating machine's barrel, and an internal metallic cylinder to guide the coolant gas and enable the use of an observation probe with operating temperature limits and with an illumination system. The method to quantify the polymer melting in plasticating

screw machines comprises the following stages:

- Location of several devices ~~according to claims 1 to 10~~ along the barrel of the plasticating screw machine;₁
- In-line visualization of the polymer inside the machine either in solid, melt state or in co-existing states, through an observation probe placed in the device ~~of claims 1 to 10~~;₁
- Joint calibration of the device's optical window ~~according to claims 1 to 10~~ and of the observation probe to determine the relationship between the visualized image and the quantified image in pixels, and thus, guarantee the precision of the measurements from the observed images;₁
- Recording of the polymer's plasticating process by capturing the images in-line and the experimental data from the inside of the plasticating screw machine with a camera and a video recorder;₁
- Determination of the solids bed's position and width from the obtained images, operating conditions and plasticating machine's geometry using an image analyzer program or software;₁ and
- Calculation of the polymer's melting profile visualized in the plasticating screw machine.